



**FPL**

MAR 26 2001

L-2001-054  
10 CFR 50.36

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D. C. 20555

Re: Turkey Point Units 3 and 4  
Docket Nos. 50-250 and 50-251  
NPDES Permit Number FL0001562  
Request for Use of Carbohydrazide

In accordance with Section 3.2.2 of the Turkey Point Units 3 and 4 Environmental Protection Plan (Appendix B of Facility Operating Licenses DPR-31 and DPR-41), enclosed is a copy of the request to revise NPDES Permit Number FL0001562 to allow the use and discharge of carbohydrazide to be used in the steam generators as part of outage wet layup activities. The use and discharge of carbohydrazide has been approved by the Florida Department of Environmental Protection (FDEP) based on conversations with FDEP staff on September 21, 2000. As discussed with FDEP staff, the request for use and discharge of carbohydrazide is submitted as a Minor Revision to the NPDES Permit.

Should there be any questions, please contact us.

Very truly yours,

R. J. Hovey  
Vice President  
Turkey Point Plant

OIH

Enclosure

cc: Regional Administrator, Region II, USNRC  
Senior Resident Inspector, USNRC, Turkey Point Plant

C 001



MAR 26 2001

PTN-LIC-01-005

Mr. Michael Hatcher  
Industrial Wastewater Section  
Florida Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

RE: FPL- Turkey Point Power Plant  
NPDES Permit Number FL0001562  
Request for use of Carbohydrazide

Mr. Hatcher,

Part E, Section 8, of NPDES Permit Number FL0001562 for the Turkey Point Plant requires that Florida Power and Light Company (FPL) notify the FDEP, in writing, at least six months prior to the planned use and discharge of any chemical or other product(s) which may be toxic to aquatic life. FPL requested the Florida Department of Environmental Protection (FDEP) approve the use of Carbohydrazide on an expedited basis. The use and discharge of Carbohydrazide was approved by FDEP based on conversations with FDEP staff on September 21, 2000. The justification for use of Carbohydrazide is documented in the Engineering Evaluation, "Turkey Point Units 3 and 4 Safety Evaluation - Use of Carbohydrazide in Steam Generator Secondary Side," (Attachment 3).

The purpose of this letter is to request a revision to NPDES Permit Number FL0001562 to incorporate the test and use of Carbohydrazide in the Turkey Point Units 3 and 4 steam generators during wet lay up outage activities. As discussed with FDEP staff, the request for use and discharge of Carbohydrazide is submitted as a Minor Revision to the NPDES Permit. Attachment 1 provides the Carbohydrazide Material Safety Data Sheet. Attachment 2 is the FPL- Turkey Point Nuclear- Carbohydrazide Fact Sheet. The notification information required by Part E, Section 8, of the NPDES permit is listed below and in the attachments to this letter as referenced. Attachment 4 is the FDEP Application for a Minor Revision to a Wastewater Facility or Activity Permit. Attachment 5 is the check for the associated application fee.

**1. Name and general composition of the chemicals:**

See attachment 1

**2. Frequency of use:**

CARBOHYDRAZIDE will be used approximately three (3) times every two (2) years during refueling outages. See attached Engineering Evaluation- Attachment 3.

**3. Quantities to be used:**

CARBOHYDRAZIDE will be batch fed at a concentration of 40-200 parts per million for all affected systems.

**4. Proposed discharge concentration:**

Discharge of Carbohydrazide from the Steam Generators during plant lay-up should be authorized without limitation or monitoring requirements.

**5. Any acute and chronic toxicity data:**

Reference MSDS sheets provided in attachment 1

**6. Product data sheet:**

See attachment 1

**7. Product label:**

See attachment 1

If you have any questions on this matter, or need any additional information, please contact Mr. William J. Burrows at (305) 246-6215.

Sincerely,



R. J. Hovey  
Vice President  
Turkey Point Plant

SF

Attachments:

- Attachment 1- MSDS for Carbohydrazide
- Attachment 2- FPL Fact Sheet
- Attachment 3- FPL Engineering Evaluation
- Attachment 4- Application for a Minor Revision to a Wastewater Facility Permit
- Attachment 5- Check for a Minor Revision to a Wastewater Facility Permit

Bcc: Sean Fletcher P/S / PTN  
James Berg CHEM/ PTN  
Gabe Mendoza CHEM/ PTN  
Bill Burrows CHEM/ PTN  
Al Gould JES/ JB  
Mike Mowbray PTN/ ENG  
PTN NPDES File



## PRODUCT

ELIMIN-OX OXYGEN SCAVENGER

## Emergency Telephone Number

Medical (800) 462-5378 (24 hours)

(800) I-M-ALERT

## SECTION 1 PRODUCT IDENTIFICATION

TRADE NAME: ELIMIN-OX OXYGEN SCAVENGER

DESCRIPTION: An aqueous solution of a modified amino compound

NFPA 704M/HMIS RATING: 1/1 HEALTH 0/0 FLAMMABILITY 0/0 REACTIVITY 0 OTHER  
 0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

## SECTION 2 HAZARDOUS INGREDIENTS

Our hazard evaluation of the ingredient(s) under OSHA's Hazard Communication Rule, 29 CFR 1910.1200 has found none of the ingredient(s) hazardous.

## SECTION 3 PRECAUTIONARY LABEL INFORMATION

CAUTION: May cause skin irritation. Avoid contact with skin and clothing. Avoid prolonged or repeated breathing of vapor. Use with adequate ventilation. Do not take internally.

Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

## SECTION 4 FIRST AID INFORMATION

EYES: Flush with water for 15 minutes.  
 SKIN: Flush with water for 15 minutes.  
 INGESTION: Induce vomiting. Give water. Call a physician.  
 INHALATION: Remove to fresh air. Treat symptoms. Call a physician.

NOTE TO PHYSICIAN: Based on the individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical condition.

CAUTION: If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.

## SECTION 5 HEALTH EFFECTS INFORMATION

PRIMARY ROUTE(S) OF EXPOSURE: Eye, Skin

EYE CONTACT: Non-irritating.  
 SKIN CONTACT: Can cause mild, short-lasting irritation.

SYMPTOMS OF EXPOSURE: A review of available data does not identify any symptoms from exposure.

AGGRAVATION OF EXISTING CONDITIONS: A review of available data does not



# MATERIAL SAFETY DATA SHEET

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## SECTION 5 HEALTH EFFECTS INFORMATION

( CONTINUED )

identify any worsening of existing conditions.

## SECTION 6 TOXICOLOGY INFORMATION

ACUTE TOXICITY STUDIES: Acute toxicity studies have been conducted on this product. The results are shown below.

ACUTE ORAL TOXICITY (ALBINO RATS): LD50 = Greater than 5 g/kg

ACUTE DERMAL TOXICITY (ALBINO RABBITS): LD50 = Greater than 2 g/kg

PRIMARY SKIN IRRITATION TEST (ALBINO RABBITS):  
SKIN IRRITATION INDEX DRAIZE RATING: 0.23/8.0 Minimal irritation

PRIMARY EYE IRRITATION TEST (ALBINO RABBITS):  
EYE IRRITATION INDEX DRAIZE RATING: 0.33/110.0 Practically non-irritating

HUMAN HAZARD CHARACTERIZATION: Based on our hazard characterization, the potential human hazard is: LOW

## SECTION 7 PHYSICAL AND CHEMICAL PROPERTIES

|                                  |                          |               |
|----------------------------------|--------------------------|---------------|
| COLOR: Colorless                 | FORM: Liquid             |               |
| DENSITY:                         | 8.5-8.6 lbs/gal.         |               |
| SOLUBILITY IN WATER:             | Completely               |               |
| SPECIFIC GRAVITY:                | 1.02-1.03 @ 60 Degrees F | ASTM D-1298   |
| pH (NEAT) =                      | 6 - 10 pH (at 1%) 6.7    | ASTM E-70     |
| VISCOSITY:                       | 3 cps @ 60 Degrees F     | ASTM D-2983   |
| FREEZE POINT:                    | 28 Degrees F             | ASTM D-1177   |
| FLASH POINT:                     | None (PMCC)              | ASTM D-93     |
| VAPOR PRESSURE:                  | 12 mm Hg @ 68 Degrees F  | ASTM D-323    |
| VOLATILE ORGANIC COMPOUND (VOC): | 0 lbs/gal.               | EPA METHOD 24 |

NOTE: These physical properties are typical values for this product.

## SECTION 8 FIRE AND EXPLOSION INFORMATION

FLASH POINT: None (PMCC) ASTM D-93

EXTINGUISHING MEDIA: Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARD: May evolve NOx under fire conditions.

PAGE 2 OF 8



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## SECTION 8 FIRE AND EXPLOSION INFORMATION

( CONTINUED )

Containers exposed in a fire should be cooled with water to prevent vapor pressure buildup leading to a rupture.

## SECTION 9 REACTIVITY INFORMATION

INCOMPATIBILITY: Avoid mineral acids and nitrites.

Avoid contact with strong oxidizers (eg. chlorine, peroxides, chromates, nitric acid, perchlorates, concentrated oxygen, permanganates) which can generate heat, fires, explosions and the release of toxic fumes.

STORAGE: Store at temperatures below 120 Degrees F and above 40 Degrees F. At temperatures below 40 Degrees F, this product loses its stability and form precipitates. Once formed, the precipitate cannot be resolubilized and loss of product activity will occur.

THERMAL DECOMPOSITION PRODUCTS: In the event of combustion CO, CO<sub>2</sub>, NO<sub>x</sub> may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

## SECTION 10 PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION: Respiratory protection is not normally needed since the volatility and toxicity are low. If significant vapors, mists or aerosols are generated, wear a NIOSH approved or equivalent respirator.

For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a positive pressure, self-contained breathing apparatus is recommended.

VENTILATION: General ventilation is recommended.

PROTECTIVE EQUIPMENT: Use impermeable gloves and chemical splash goggles when attaching feeding equipment, doing maintenance or handling product. Examples of impermeable gloves available on the market are neoprene, nitrile, PVC, natural rubber, viton and butyl (compatibility studies have not been performed).

The availability of an eye wash fountain and safety shower is recommended.

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION: Based on Nalco's recommended product application and our recommended personal protective equipment, the potential human exposure is: LOW.



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## SECTION 11 SPILL AND DISPOSAL INFORMATION

IN CASE OF TRANSPORTATION ACCIDENTS, CALL THE FOLLOWING 24-HOUR TELEPHONE NUMBER (800) I-M-ALERT or (800) 462-5378.

### SPILL CONTROL AND RECOVERY:

Small liquid spills: Contain with absorbent material, such as clay, soil or any commercially available absorbent. Shovel reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to CERCLA in Section 14.

Large liquid spills: Dike to prevent further movement and reclaim into recovery or salvage drums or tank truck for disposal. Refer to CERCLA in Section 14.

For large indoor spills, evacuate employees and ventilate area. Those responsible for control and recovery should wear the protective equipment specified in Section 10.

DISPOSAL: If this product becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous liquid waste, it should be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no free liquid remains before disposal to an industrial waste landfill. A non-hazardous liquid waste can also be deep-well injected in accordance with local, state and federal regulations.

## SECTION 12 ENVIRONMENTAL INFORMATION

### AQUATIC DATA:

Results below are based on the product.

96 hour static acute LC50 to Bluegill Sunfish = 190 ppm

96 hour static acute LC50 to Rainbow Trout = 360 ppm

96 hour static acute LC50 to Fathead Minnow = 400 mg/L

96 hour no observed effect concentration is 100 mg/L based on no mortality or abnormal effects.

48 hour static acute LC50 to Daphnia magna = 96 mg/L



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## SECTION 12 ENVIRONMENTAL INFORMATION

( CONTINUED )

48 hour no observed effect concentration is 20 mg/L based on no mortality or abnormal effects.

If released into the environment, see CERCLA in Section 14.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION: Based on our Hazard Characterization, the potential environmental hazard is: LOW. Based on Nalco's recommended product application and the product's characteristics, the potential environmental exposure is: LOW.

## SECTION 13 TRANSPORTATION INFORMATION

PROPER SHIPPING NAME/HAZARD CLASS MAY VARY BY PACKAGING, PROPERTIES, AND MODE OF TRANSPORTATION. TYPICAL PROPER SHIPPING NAMES FOR THIS PRODUCT ARE:

ALL TRANSPORTATION MODES : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

## SECTION 14 REGULATORY INFORMATION

The following regulations apply to this product.

### FEDERAL REGULATIONS:

OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:  
Based on our hazard evaluation, this product is not hazardous.

CERCLA, 40 CFR 117, 302:  
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986  
(TITLE III) - SECTIONS 302, 311, 312 AND 313:

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355):  
This product does not contain ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 and 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370):  
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the





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## SECTION 14 REGULATORY INFORMATION

( CONTINUED )

reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372):  
This product does not contain ingredients on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA):  
The chemical ingredients in this product are on the 8(b) Inventory List (40 CFR 710).

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261 SUBPART C & D:  
Consult Section 11 for RCRA classification.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 (formerly Sec. 307), 40 CFR 116 (formerly Sec. 311):  
None of the ingredients are specifically listed.

CLEAN AIR ACT, Sec. 111 (40 CFR 60), Sec. 112 (40 CFR 61, 1990 Amendments), Sec. 611 (40 CFR 82, CLASS I and II Ozone depleting substances):  
This product does not contain ingredients covered by the Clean Air Act.

### STATE REGULATIONS:

CALIFORNIA PROPOSITION 65:  
Hydrazine is known to the State of California to cause cancer. This product contains levels of hydrazine as an impurity at less than 0.01%.

MICHIGAN CRITICAL MATERIALS:  
This product does not contain ingredients listed on the Michigan Critical Materials Register.

STATE RIGHT TO KNOW LAWS:  
The following ingredient(s) are disclosed for compliance with State Right To Know Laws:

|                |           |
|----------------|-----------|
| Carbohydrazide | 497-18-7  |
| Water          | 7732-18-5 |

### INTERNATIONAL REGULATIONS:



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## SECTION 14 REGULATORY INFORMATION

( CONTINUED )

This is not a WHMIS controlled product under The House of Commons of Canada Bill C-70.

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## SECTION 15 ADDITIONAL INFORMATION

None

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## SECTION 16 RISK CHARACTERIZATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

- \* The human risk is: LOW.
- \* The environmental risk is: LOW.

Any use inconsistent with Nalco's recommendations may affect our risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to ensure safe workplace operations. Please consult your local sales representative for any further information.

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## SECTION 17 BIBLIOGRAPHY

ANNUAL REPORT ON CARCINOGENS, U.S. Department of Health and Human Services, Public Health Service, PB 33-135855, 1983.

CASARETT AND DOULL'S TOXICOLOGY, THE BASIC SCIENCE OF POISONS, Doull, J., Klaassen, C. D., and Admur, M. O., eds., Macmillian Publishing Company, Inc., N. Y., 4th edition, 1996.

CHEMICAL HAZARDS OF THE WORKPLACE, Proctor, N. H., and Hughes, J. P., eds., J. P. Lipincott Company, N.Y., 3rd edition, 1991.

PAGE 7 OF 8



# MATERIAL SAFETY DATA SHEET

PRODUCT

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Medical (800) 462-5378 (24 hours)

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SECTION 17 BIBLIOGRAPHY

( CONTINUED )

DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, Sax, N. Irving, ed., Van Nostrand Reinhold Company, N.Y., 9th edition, 1996.

IARC MONOGRAPHS ON THE EVALUATION OF THE CARCINOGENIC RISK OF CHEMICALS TO MAN, Geneva: World Health Organization, International Agency for Research on Cancer.

PATTY'S INDUSTRIAL HYGIENE AND TOXICOLOGY, Clayton, G. D., Clayton, F. E., eds., John Wiley and Sons, N. Y., 4th edition, Vol. 2 A-F, 1994.

REGISTRY OF TOXIC EFFECTS ON CHEMICAL SUBSTANCES, U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health, 1983 supplement of 1981-1982 edition, Vol. 1-3, OH, 1984.

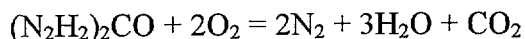
Title 29 Code of Federal Regulations Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES AND PHYSICAL AGENTS IN THE WORKROOM ENVIRONMENT WITH INTENDED CHANGES, American Conference of Governmental Industrial Hygienists, OH.

PREPARED BY: William S. Utley, PhD., DABT, Manager, Product Safety  
DATE CHANGED: 09/28/95 DATE PRINTED: 06/18/96

## FPL – Turkey Point Nuclear Plant - Carbohydrazide Fact Sheet

1. Carbohydrazide in an aqueous solution of a modified amino compound.
2. The breakdown of carbohydrazide under “ambient” conditions of temperature and pressure is as follows:



Under temperature (above 275°F), it breaks down into hydrazine and carbon dioxide.

3. Current dosing rates of hydrazine during wet lay-up are 75-150 ppm. Carbohydrazide is dosed at 1.3 times hydrazine so the new rate will be approximately 100-200 ppm.
4. At the end of the re-fueling outage, the steam generators (or at least some portion thereof) that contain the 100 ppm of carbohydrazide will be drained to the Turkey Point cooling canals (These canals are not classified as waters of the United States). Each of the three (3) steam generators contains approximately 26,000 gallons of water that is released at a rate of approximately 225 gpm. This “blowdown” is mixed with the effluent from a circulating water pump (156,000 gpm). In reality, the carbohydrazide will break down very rapidly to nitrogen, carbon dioxide and water. However, the blowdown effluent will be analyzed and a “hydrazine” level will be determined. If you run the calculation (even assuming all carbohydrazide as hydrazine), as required by the facility’s NPDES permit:

$$225 \text{ gpm (Blowdown Flow)} \times 100 \text{ PPM (Hydrazine Concentration)} / 156,000 \text{ gpm} \\ = 0.144 \text{ ppm of hydrazine (Permit trigger for call to DEP is 3.4 ppm)}$$

Please note that this calculation is extremely conservative as there are actually four (4) circulating water pumps providing dilution and there should be little to no hydrazine present in the discharge.

5. Comparison of Aquatic Toxicity (from MSDS sheets)

| <u>Organism</u>      | <u>Hydrazine LC50</u> | <u>Carbohydrazide LC50</u> |
|----------------------|-----------------------|----------------------------|
| Rainbow trout        | 4.3 ppm               | 360 ppm                    |
| Bluegill             | 4.2 ppm               | 190 ppm                    |
| <i>Daphnia magna</i> | 0.46 ppm              | 96 ppm                     |



FPL

**NUCLEAR SAFETY EVALUATION REVIEW CHECKLIST**

NUMBER: PTN-ENG-SEMS-00-0077 R-14 OCA 9/27/00

TITLE: USE OF CARBOHYDRAZIDE IN STEAM GENERATOR SECONDARY SIDE

1. Potential Corrective Action Items identified in review :  
As listed on Pg 15-17 of the Eval TO PMAI Coord 9/27/00 [Signature]

2. The following plant departments/groups have reviewed and signed off on the attached Nuclear Safety Evaluation :

| NAME OF REVIEWER | DEPARTMENT |
|------------------|------------|
| R. Flynn         | OPS.       |
| S. Franzone      | LIC.       |
| J. Berg          | Chem       |
| J. Reed          | PCC        |

3. ENGINEERING MANAGER REVIEW:

Signature: [Signature] Date: 9/27/00

4. PNSC Review:

PNSC Vice-Chairman Signature: [Signature] Date: 9/27/00  
PNSC Meeting No. 105-0145

5. Plant General Manager Review:

Signature: [Signature] Date: 9/27/00  
Compensatory/corrective actions transmitted to PMAI Coordinator.

Signature \_\_\_\_\_ Date \_\_\_\_\_

7. Safety Evaluation transmitted to Site Document Control.

Signature \_\_\_\_\_ Date \_\_\_\_\_



FPL

Hot

TO: SEE BELOW

DATE: 9/7/99

FROM: Steve Boling

DEPARTMENT: CONFIGURATION CONTROL

SUBJECT : **SAFETY EVALUATION**

DUE DATE

Safety Eval.# PTN-ENG-SENS-00-077

REV# 0

Attached please find the subject Evaluation. This Evaluation is being transmitted to you in accordance with 0-ADM-507, Processing evaluations, for review/information.

**!! Required reviewers, please complete the attached comment sheet and return to P.C.C. before due date . Should you have any questions, please feel free to contact Rose Mary Walker at ext.7111 or Steve Boling at ext. 6230**

Steve Boling  
Configuration Control Supervisor.

**Required Reviewers**

**Information Only**

(Documented on comment sheets)

(Reviewer/comments not required)

| Name        | Dept | Comments | Name | Dept |
|-------------|------|----------|------|------|
| R. FLYNN    | OPS  |          |      |      |
| S. BOLING   | PCC  | None     |      |      |
| J. Berg     | Chem |          |      |      |
| S. Franzone | Lic. |          |      |      |
|             |      |          |      |      |



Inter-Office Correspondence

PTN-ENG-00-0291

To: R. J. Earl Date: SEP 26 2000  
From: D. J. Tomaszewski Department: ENG  
Subject: Turkey Point Unit 3/4 *not 4/25/00*  
Safety Evaluation PTN-ENG-SEMS-00-0077, Rev. 0  
Use of Carbonylhydrazide in Steam Generator Secondary Side

The approved final version of the subject safety evaluation is attached for PNSC review. Minimum quorum comments are also attached for your information.

Please call M. Mowbray at x-6205 should you have any questions.

Action items

- Process PTN-ENG-SEMS-00-0077, Rev. 0 for PNSC review.
- Issue PMAIs for nine (9) action items contained on pages 15-17 of the attached evaluation.

  
D. J. Tomaszewski  
PTN Engineering Manager

DJT/ATZ/JJC/JMM:pt *JJC*

Attachments

cc: M. J. Ottilige

**FLORIDA POWER & LIGHT CO.**

**TURKEY POINT UNITS 3 & 4**

**SAFETY EVALUATION**

**USE OF CARBOHYDRAZIDE  
IN STEAM GENERATOR  
SECONDARY SIDE**

**PTN-ENG-SEMS-00-0077**

**REVISION 0**

**NUCLEAR SAFETY RELATED**

Approved: 

**Turkey Point Plant Manager**

*PNJC# 00-145*

*- 26 Sept 85*



### REVIEW AND APPROVAL RECORD

PLANT Turkey Point UNIT 3&4

TITLE Use of Carbohydrazide in Steam Generator Secondary Side

LEAD DISCIPLINE Mechanical

ENGINEERING ORGANIZATION Turkey Point Site Engineering

**REVIEW/APPROVAL:**

| GROUP     | INTERFACE TYPE |        |     | PREPARED                   | VERIFIED                   | APPROVED   | FPL APPROVED* |
|-----------|----------------|--------|-----|----------------------------|----------------------------|--|---------------|
|           | INPUT          | REVIEW | N/A |                            |                            |  |               |
| MECH      | X              |        |     | <i>[Signature]</i> 9/21/00 | <i>[Signature]</i> 9/21/00 | <i>[Signature]</i> 9/23/00                               |               |
| ELECT     |                |        | X   |                            |                            |  |               |
| I&C       |                |        | X   |                            |                            |  |               |
| CIVIL     |                |        | X   |                            |                            |  |               |
| DES BAS** |                | X      |     |                            |                            | <i>[Signature]</i> 9/21/00                               |               |
| CSI       |                | X      |     |                            |                            | <i>[Signature]</i> for Gary Boyes per email app. 9/21/00 |               |
| NUC FUEL  |                |        | X   |                            |                            |  |               |
| SG MGMT   |                | X      |     |                            |                            | <i>[Signature]</i> for JAS staff per telecon 9/21/00     |               |

\* For Contractor Evals As Determined By Projects    \*\* Review Interface As A Min On All 10CFR50.59 Evals and PLAs

FPL PROJECTS APPROVAL: *[Signature]* DATE: 9-25-00

**OTHER INTERFACES**

Chemistry

Table of Contents

**Abstract**..... 4

**Purpose** ..... 5

**Safety Classification** ..... 5

**Background** ..... 5

**Evaluation** ..... 6

**Chemical Compatibility** ..... 7

**Material Compatibility**..... 10

**OSHA/Environmental Issues** ..... 11

**Application Requirements**..... 11

**Summary**..... 12

**50.59 Evaluation** ..... 13

**Conclusion** ..... 15

**Action Items** ..... 15

**References** ..... 17

**Abstract**

Dissolved oxygen controls and secondary chemistry requirements applicable to the steam generators are outlined in the FSAR and defined in greater detail within the Nuclear Chemistry Parameters Manual. Those requirements are generally based on the PWR Secondary Water Chemistry Guidelines published by EPRI. An INPO assist visit and subsequent Engineering Evaluation identified that Turkey Point should evaluate carbonylhydrazide as an alternate control method for dissolved oxygen in the steam generators during wet layup.

The application of carbonylhydrazide has been reviewed for compatibility with the existing secondary chemistry controls, fabrication materials, OSHA and environmental impacts and system operating requirements. Carbonylhydrazide was found to be compatible with all existing chemicals and fabrication materials and to have no significant impact on either OSHA or environmental requirements. The use of carbonylhydrazide will not impact wet layup system operation and will permit a smooth transition into operating chemistry requirements for the steam generator secondary side.

This evaluation has determined that the use of carbonylhydrazide for control of dissolved oxygen in the secondary side water chemistry in the steam generators does not introduce an unreviewed safety question and does not require a change to the Technical Specifications. Therefore, prior NRC approval of this Safety Evaluation is not required.

### Purpose

The FSAR provides some overall chemistry guidance for the steam generators, including some detailed requirements applicable to power (mode 1) operation; however, detailed secondary water chemistry requirements applicable to the steam generators over all modes are defined within the Nuclear Chemistry Parameters Manual. Control of dissolved oxygen is a recognized requirement within both sources as well as applicable industry guidelines. Hydrazine has been generally used for control of dissolved oxygen, but that compound is largely ineffective at ambient temperatures. An alternate material, carbohydrazide (also called carbonic dihydrazide), provides effective oxygen scavenging at ambient temperatures. That compound will be assessed by this evaluation for use in the steam generator secondary side during wet layup conditions.

### Safety Classification

The control of dissolved oxygen in the S/G secondary side during wet layup is not inherently classified as safety related; however, the steam generator pressure vessels are classified as Safety Related per several P&IDs and the Passport Equipment Data Module (TEDB). The potential to adversely impact the integrity of the steam generator pressure boundary is considered to be Safety Related. On that basis, this Engineering Evaluation is classified as Safety Related.

### Background

As noted above, the FSAR, Nuclear Chemistry Parameters Manual (NCPM) and industry guidelines all recognize that control of dissolved oxygen is a primary part of steam generator (SG) corrosion control. Multiple approaches are available to meet that control parameter, including control of oxygen within makeup sources, mechanical deaeration and chemical scavenging. Turkey Point uses both mechanical and chemical controls to effectively remove dissolved oxygen during normal power operation. However, at cold shutdown conditions, those control techniques are either not available or are ineffective. Hydrazine has a very limited reaction at low temperatures and will not provide effective oxygen control except at high concentrations. An elevated hydrazine concentration has several liabilities as well, including OSHA exposure concerns, environmental release concerns and the potential for a substantial ammonia peak at startup. An alternate chemical scavenging technique that eliminates these liabilities is required as Turkey Point has no immediate option to control oxygen content in makeup water. Carbohydrazide appears to provide that chemical scavenging option.

Initial environmental review of the use of carbohydrazide was conducted by corporate environmental personnel and the Florida Department of Environmental Protection (DEP). That review concluded that carbohydrazide is, in essence, covered by the existing permit for hydrazine and verbal approval for its use was given. However, the review also determined that a revision to the existing NPDES release permit is appropriate. Approval of carbohydrazide cannot be completed under the existing

procedures for 50.59 screening. Therefore, the review of carbonylhydrazide has been issued as a Safety Evaluation, including a 10CFR50.59 evaluation. This evaluation will require PNSC approval.

### Evaluation

The Turkey Point FSAR provides limited detail on the requirements for secondary water chemistry. Chapter 4, Table 4.2-3, provides guidelines for pH, conductivity and contaminant levels limited to power (mode 1) operations. The means of meeting those requirements is not clearly defined. Subsection 10.2.4.1 further discusses chemical addition, including specific mention of ammonium hydroxide, alternate amines and hydrazine. That discussion is limited to power operation as it specifically delineates addition via the condensate pump discharge (a power operation alignment). Discussions within the FSAR addressing the SG wet layup system provide no details on chemical controls or secondary chemistry limits. Subsection 10.2.4.5 states only that the system provides a means to add chemicals to prevent excursions in water quality during wet layup conditions. The remaining secondary chemistry requirements not detailed within the UFSAR are delegated by that document to the Nuclear Chemistry Parameters Manual. The Technical Specifications contain no requirements relating to secondary water chemistry, with the exception of activity limits (which are beyond the scope of this evaluation), the indirect assessment of secondary water chemistry control implied via inspection requirements for the steam generator tubes and programmatic requirements (i.e., a controlled program is required) supplied within the Administrative Controls section. There is no Design Basis Document for the steam generators or the SG wet layup system and no DBD that generically addresses secondary water chemistry requirements.

The Nuclear Chemistry Parameters Manual (reference 3) provides requirements for most aspects of secondary system water chemistry, including detailed requirements for cold shutdown/wet layup conditions. The NCPM duplicates published EPRI guidelines (reference 5) with respect to dissolved oxygen. Requirements are established for the supply source and for minimum hydrazine concentration; however, no requirement for dissolved oxygen levels is specified for wet layup conditions. That requirement reflects the lack of an effective means to control oxygen at low temperatures. The development of carbonylhydrazide (and other alternate oxygen scavengers) has modified that situation. Section 5.6.1 of the revised EPRI guidelines (reference 4) recognizes the option to use an alternate means of oxygen control, compensating for lack of control in a fill source and the limited effectiveness of hydrazine under layup conditions. This evaluation will furnish the qualification basis for and requirements applicable to the use of carbonylhydrazide.

Both the NCPM and the EPRI guideline divide chemistry requirements into three "phases" of steam generator operation. Specifically, they address cold shutdown/wet layup (equivalent to modes 5 & 6), heatup/hot shutdown with RCS > 200°F and reactor power < 5% (equivalent to modes 2, 3 & 4) and power operation with reactor power > 5% (equivalent to mode 1). The use of carbonylhydrazide will be limited to cold shutdown/wet layup conditions. Carbonylhydrazide thermally decomposes at

temperatures above 300°F and is inappropriate for use as a control measure above mode 5. In addition, subsection 10.2.4.1 of the FSAR indicates that hydrazine is used for oxygen removal at power. The following sections of this evaluation will address the various aspects associated with the qualification of a new chemical for use in the steam generators. Included will be chemical and material compatibility, OSHA and environmental exposure concerns and application requirements. Each is addressed in detail below.

### Chemical Compatibility

Several issues are associated with the chemical compatibility of carbohydrazide with existing secondary side chemistry controls. Carbohydrazide must be reviewed for potential interactions with existing chemicals, purity/contaminant level concerns, potential impacts on secondary side chemistry limits, impacts on existing analytical methods and requirements and functionality within the secondary side. Each of these issues is addressed in greater detail in the following paragraphs.

Interactions with existing chemicals is limited to a review of those chemicals used in the day-to-day control of secondary chemistry, including power operation. MSDS data of typical carbohydrazide products (e.g., Control OS5613 from BetzDearborn and Eliminox from Nalco) indicates that the compound should not be placed in contact with strong oxidizers or alkalis. Strong oxidizers are not typically used within the secondary systems at PTN; however, a relatively strong alkali can be used for pH control. In this instance, contact between the carbohydrazide and the strong alkali in their concentrated forms could only occur within the bounds of the chemical addition tank for the SG wet layup system. After injection, both chemicals are too dilute to have any significant interaction. Procedural control of chemical addition will eliminate any potential for this adverse interaction. An action is assigned to ensure adequate procedural control is established.

Carbohydrazide will also have the potential to interact with other chemicals used for corrosion control within the secondary systems. Those chemicals include hydrazine, ETA (ethanolamine), DMA (dimethylamine), morpholine, MPA (methoxypropylamine) and boric acid (note that the approval of DMA, morpholine, MPA and boric acid is pending at this time). Carbohydrazide is essentially a derivative of hydrazine; carbohydrazide and hydrazine will not adversely interact. Carbohydrazide also will not react with ETA, DMA, morpholine, MPA or boric acid under the dilute conditions existing in the secondary system. The only potential interaction with any of the amines is via the carbon dioxide reaction product from carbohydrazide. Carbon dioxide will be neutralized by the amines and thus could impose a small amine "load" influencing required feed rates. The corrosion control properties of the amines is not impacted. On those bases, no potential for adverse interaction between carbohydrazide and any chemical used to control secondary water chemistry exists. Carbohydrazide may be used in conjunction with other approved chemicals with the single restriction that each chemical must be added separately.

As discussed above, the NCPM establishes limits and restrictions on contaminant levels within the secondary systems. Those requirements and the associated monitoring requirements apply in some form for all modes of operation for the steam generators. In support of the contaminant limits, secondary water chemistry control chemicals are procured with chemical certification as defined in section 4 of the NCPM. Requirements exist for all secondary chemicals. Similar requirements are applicable to carbonylhydrazide. In order to ensure that unacceptable contaminant levels are not reached, the carbonylhydrazide must be purchased to purity requirements equivalent to those for hydrazine or ETA. An action is established below to provide bulk chemical procurement requirements for carbonylhydrazide, including limits on chlorides, fluorides and sodium. Those procurement requirements eliminate the potential that carbonylhydrazide will result in an unacceptable excursion in secondary water chemistry contaminant levels.

Two potential paths exist for carbonylhydrazide to impact established secondary chemistry limits. Those paths include unacceptable contaminant levels (discussed above) and/or unexpected decomposition or reaction conditions. Reaction conditions with existing chemicals have already been discussed and eliminated as a concern. Adverse interactions with existing materials are addressed in the "Material Compatibility" section below. The remaining potential concern is an unexpected or unacceptable decomposition product. Carbonylhydrazide decomposes in two ways, the oxygen scavenging reaction and thermal decomposition. The oxygen scavenging reaction produces nitrogen, water and carbon dioxide as its only byproducts. Thermal decomposition produces hydrazine and carbon dioxide. Carbon dioxide has the potential to depress pH and raise cation conductivity, but otherwise has no potential adverse interaction with secondary water chemistry. Hydrazine can raise pH and hydrazine concentration. All three potential decomposition results - pH, cation conductivity and hydrazine concentration - are monitored parameters within secondary chemistry and require further review.

Carbonylhydrazide is essentially neutral and does not provide the alkali pH buffer that is present with hydrazine. As a result, a high consumption event, such as initial oxygen scavenging of a refilled SG, could produce sufficient carbon dioxide to measurably change pH. If a pH buffer is present, such as ammonium hydroxide, the CO<sub>2</sub> produced will not impact secondary chemistry. Thermal breakdown produces both CO<sub>2</sub> and hydrazine, with hydrazine predominating. The thermal reaction essentially produces its own pH buffer. Carbon dioxide production cannot adversely impact pH under adequate procedural control. Procedure changes required to implement carbonylhydrazide will include the pH buffer requirements noted. Decomposition of carbonylhydrazide will not adversely impact pH.

Carbon dioxide production also has the potential to adversely impact cation conductivity. The primary oxygen scavenging function of carbonylhydrazide will be during cold shutdown/wet layup conditions. The NCPM has no cation conductivity criteria for the steam generators under those conditions. As the steam generator is heated and operating chemistry conditions are established, the CO<sub>2</sub> byproduct will be removed via normal steaming or via amine neutralization. Either method effectively

removes the potential for carbohydrazide to adversely impact cation conductivity on a long term basis. The short term impact is insignificant and has no potential to adversely impact the steam generators.

The final decomposition issue involves hydrazine production through thermal breakdown. Hydrazine can raise system pH as well as impacting overall hydrazine concentration. Thermal breakdown will occur coincident with the requirement to establish operating chemistry conditions in the secondary systems, including establishing operating hydrazine concentrations. The thermal breakdown production essentially displaces some part of the hydrazine demand necessary to establish operating conditions. If procedurally accounted for in establishing operating conditions, no potential exists for carbohydrazide to adversely impact either the pH or hydrazine concentrations. As with the pH buffer requirement discussed above, procedure changes instituted for carbohydrazide implementation will include the guidelines necessary to address hydrazine production via thermal breakdown. Carbohydrazide will not adversely impact secondary chemistry in that manner.

Under the procedural requirements established to satisfy this evaluation, carbohydrazide will not adversely impact secondary system pH, cation conductivity or hydrazine concentrations. Decomposition of carbohydrazide under both oxygen scavenging and thermal breakdown conditions is compatible with existing secondary chemistry requirements.

Experience within the nuclear industry has identified a reported "interference" between carbohydrazide and a standard test used to assess hydrazine levels. That concern has been identified only at a single station (Fort Calhoun) and is not common to other nuclear plants using carbohydrazide. However, in order to insure that no such condition could exist, an action is assigned to verify that hydrazine analytical techniques used at PTN are still adequate with carbohydrazide present.

The final chemical compatibility issue is function; specifically the oxygen scavenging function of carbohydrazide. While hydrazine has an extremely limited oxygen scavenging reaction at ambient temperatures, carbohydrazide has been confirmed to be effective at wet layup temperatures by both testing and industry experience. As discussed above, the byproducts of this low temperature reaction are compatible with existing secondary system chemistry requirements. Elevated temperature will eventually decompose the carbohydrazide into hydrazine, which remains compatible with secondary chemistry limitations. Heatup of a steam generator treated at ambient conditions with carbohydrazide could result in some minor deviations in cation conductivity and minor increases in amine loading; however, the heatup cycle would be expected to remain within established steam generator chemistry limitations while following existing procedures and responses. The low temperature oxygen scavenging function of carbohydrazide will mesh smoothly with elevated temperature controls provided by hydrazine and mechanical gas removal. Carbohydrazide will enhance corrosion protection of the steam generator secondary side components.



From a chemical compatibility perspective carbonylhydrazide is acceptable for use with the established secondary side chemistry control program at PTN. The administrative controls discussed above ensure that compatibility. Conditions established using carbonylhydrazide in wet layup can be smoothly transitioned into operating chemistry without the necessity of draining and refilling the SG. That transition saves both time and water inventory and maintains a low dissolved oxygen environment within the SG secondary side during heatup operations. Draining and refilling the SG with oxygen saturated water prior to heatup is not recommended and would violate the requirements of \*-OP-079.

### Material Compatibility

Material compatibility must be addressed for both normal operating components and those components only involved in wet layup conditions. Operating components include the main steam and feedwater systems in addition to the steam generator. Wet layup components include the steam generator wet layup system with its associated pumps, valves and chemical addition system. The remaining components in the power generation cycle should not be exposed to carbonylhydrazide as thermal decomposition should be complete before any steam/feedwater flow occurs.

Typical MSDS information indicates that carbonylhydrazide is not compatible with low carbon steels (e.g., structural grade carbon steels), aluminum or copper. Those materials are not used in the construction of any operating or wet layup component that could be exposed to carbonylhydrazide. Potential contaminants within the injected product are addressed by the chemical certification requirements discussed above. Those controls ensure that there can be no adverse interaction between carbonylhydrazide in its injected form and any installed component.

In addition to exposure to the injected product, breakdown products from oxygen scavenging and thermal decomposition may be present. The wet layup system will only be exposed to the original product and to the breakdown products from oxygen scavenging. Thermal breakdown products will not be present in the SG wet layup system. The steam generator, steam and feedwater systems are exposed to both sets of breakdown products. Oxygen scavenging products include nitrogen, water and CO<sub>2</sub>, while thermal breakdown produces hydrazine and CO<sub>2</sub>. Hydrazine, water and nitrogen are already approved for use in the secondary systems. Only CO<sub>2</sub> is newly introduced via the carbonylhydrazide (note that CO<sub>2</sub> in solution would also be a typical startup transient due to air exposure). Any carbon dioxide remaining in solution would form carbonic acid, a weak, unstable organic acid that has the potential to impact pH and cation conductivity. The pH impact would be negligible based on the small absolute amount of CO<sub>2</sub> produced. That impact has been confirmed by actual field application at other utilities. An increase in cation conductivity due to organic acid formation has been previously assessed (reference 6). That assessment concluded that steam generator materials would not be adversely impacted by the high cation conductivity produced. Based on that conclusion, the SG wet layup system materials are also judged to be unaffected by CO<sub>2</sub> generation.

In essence, the application of carbonylhydrazide does not produce any new potentials for adverse interaction with the materials of construction used for the SG, feedwater, main steam or wet layup systems. No added controls are required to ensure material compatibility for the application of carbonylhydrazide in the secondary system during wet layup conditions.

### OSHA/Environmental Issues

Unlike the hydrazine it will replace during wet layup, carbonylhydrazide is not a hazardous material nor is it a known carcinogen. The material is not toxic per MSDS data, which will simplify handling and storage requirements. Chemical addition procedures and methods already being applied for ammonium hydroxide will be adequate for carbonylhydrazide.

The existing NPDES permit for the Turkey Point site addresses the use of both hydrazine and ETA; however, it does not include carbonylhydrazide. There is no express intent to discharge carbonylhydrazide; however, control of the SG secondary chemistry may, at some time, require draining of the secondary side contents, including carbonylhydrazide used for oxygen control. Carbonylhydrazide is, as previously discussed, a derivative of hydrazine, although it is not considered a hazardous material. Discussions between corporate environmental personnel and Florida DEP concluded that carbonylhydrazide, as a hydrazine derivative, is essentially covered by the existing permit. Verbal approval was provided by DEP for the use of carbonylhydrazide. However, a revision to the NPDES permit is required to formalize the approval for use of the chemical on-site. Approval by the DEP verbally provides assurance that the requirements of the Environmental Protection Plan are adequately addressed. An action is assigned to complete activities with the Florida DEP to obtain the necessary revision to the NPDES permit. That activity does not impact approval to proceed with the use of carbonylhydrazide.

Entry into the steam generators while carbonylhydrazide is present is feasible; however, as an oxygen scavenger, the compound has the potential to create an oxygen deficient atmosphere. Existing practices and procedures for entry into confined spaces adequately address the potential hazards associated with the use of carbonylhydrazide.

Carbonylhydrazide is not flammable and is compatible with existing extinguishing agents used on site. No changes to the existing Fire Protection plan are required to address the use of carbonylhydrazide.

### Application Requirements

Implementation of carbonylhydrazide as the oxygen removal agent during wet layup conditions will not require many changes to existing procedures or requirements. As noted above, carbonylhydrazide can use existing equipment and procedures for chemical injection via the SG wet layup system. No special handling, pumping equipment or valve alignment is required to support this material. The existing procedure for

operation of the SG wet layup system (reference 7) is adequate as written, with the exception that carbohydrazide must be incorporated as an option to control dissolved oxygen, including its applicable precautions. Chemistry procedures will require modification to address analytical techniques, monitoring requirements and verification testing requirements for carbohydrazide. Action items are assigned to address all of these changes.

The NCPM will require several changes to address the application of carbohydrazide. The first, discussed above, is chemical certification requirements applicable to the compound. This evaluation is not specific to a single manufacturer or formulation (concentration) of carbohydrazide. The material is offered in multiple concentrations and purity levels. Preliminary investigation has noted that selection of an "ultra pure" version will typically be required to obtain the testing and certification necessary to meet applicable contaminant limits. Working concentrations within the steam generator also vary dependent upon the source. Manufacturer suggestions and other utility experience point to a band from 40-200 ppm as an appropriate starting point. EPRI guidelines identify a recommended carbohydrazide concentration of approximately 100 ppm. A specific requirement and associated action levels must be developed after a product is selected for procurement. An action item has been assigned to obtain a manufacturer recommendation for the initial carbohydrazide application. That number can then be modified using site specific experience for future applications.

The NCPM will also require modification to include the necessary precautions and discussions associated with thermal breakdown of carbohydrazide and the transition to operating chemistry. These changes are outlined in the action items below.

Summarizing, the implementation of carbohydrazide will require changes to multiple Chemistry Department procedures and documents. No physical system or equipment changes are necessary, nor are changes required to the operation of the SG wet layup system (including chemical addition), with the exception of adding carbohydrazide as an oxygen control option with its associated precautions.

### Summary

In summary, the application of carbohydrazide as an oxygen scavenging agent in the steam generators during wet layup conditions is compatible with existing chemical treatment procedures/programs and existing materials and components. The new compound is not hazardous and may be handled, stored and used in accordance with existing procedures. No new handling or protection requirements apply. Implementation requires changes to existing chemistry procedures, analysis techniques and monitoring requirements, but does not impact any operating procedure (except added precautions). A final environmental approval via revision of the NPDES permit is required, but does not impact proceeding with implementation. It is concluded that carbohydrazide is an effective alternate treatment method for dissolved oxygen in the steam generator secondary side that meets or exceeds the requirements defined by EPRI documents and supported by INPO practices.

### 50.59 Evaluation

The following evaluation is based upon review of the Turkey Point UFSAR and Technical Specifications. Specific sections utilized for this evaluation include 4.2 and 10.2 as well as TS 3.7.1.4 and 6.8.4.c.

- 1) May the proposed activity increase the probability of occurrence of an accident previously evaluated in the SAR?

NO: The UFSAR does not specifically discuss the means of oxygen control applied during cold shutdown/wet layup conditions in the steam generators and contains no reference to the EPRI chemistry guidelines. The FSAR only outlines maximum permissible contaminant levels and chemical controls used during normal power operations with the intent of protecting the integrity of the steam generator tubes (primary pressure boundary). The secondary chemistry requirements not addressed by the FSAR are delegated to the Nuclear Chemistry Parameters Manual. The application of carbohydrazide during cold shutdown/wet layup conditions is consistent with the revised EPRI guidelines for steam generator secondary chemistry, which represent the recognized industry standard for control of steam generator tube degradation. The application of carbohydrazide also conforms to all existing requirements specifically stated within the UFSAR. The conclusions reached by this evaluation and actions specified do not increase the probability of occurrence of any accident evaluated in the FSAR.

- 2) May the proposed activity increase the consequences of an accident previously evaluated in the SAR?

NO: The potential impacts associated with carbohydrazide involve degradation of secondary or primary pressure boundary or potential environmental impacts. The Florida DEP has determined that the use of carbohydrazide is acceptable; potential environmental consequences are unchanged. As noted above, the use of carbohydrazide does not increase the potential for degradation of pressure boundary integrity. This chemical cannot impact source term conclusions or release rates, pathways or mechanisms evaluated within the FSAR as it acts only for corrosion control as an oxygen scavenger. No interaction with existing chemicals or materials will occur. The consequences of accidents previously evaluated in the FSAR will not be affected by the use of carbohydrazide.

- 3) May the proposed activity increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the SAR?

NO: The application of carbohydrazide in the steam generators will enhance corrosion control and minimize degradation of the steam generator tubes. In

addition, carbonylhydrazide will not adversely interact with any existing corrosion control mechanism or program and is compatible with all existing equipment and materials. Enhanced corrosion control does not increase the probability of occurrence of any malfunction of equipment important to safety.

- 4) May the proposed activity increase the consequences of a malfunction of equipment important to safety previously evaluated in the SAR?

NO: The application of carbonylhydrazide will not result in any adverse interaction with existing equipment, materials or chemical control programs. Its application cannot change existing source terms or modify release rates, pathways or mechanisms for radioactive effluents. Environmental review has concluded that carbonylhydrazide is essentially bounded by the existing NPDES release permit (although a formal revision is necessary) and does not impact the Environmental Protection Plan. The consequences of equipment malfunctions are independent of the application of carbonylhydrazide. No consequence of a malfunction of equipment important to safety is increased by the use of carbonylhydrazide.

- 5) May the proposed activity create the possibility of an accident of a different type than previously evaluated in the SAR?

NO: The FSAR already evaluates a variety of accidents associated with the pressure boundary materials that will be exposed to carbonylhydrazide. The failure mechanism assumed for those events is explicitly detailed; however, the potential for a corrosion related failure, especially of SG tubes, exists. The application of carbonylhydrazide will act to decrease the potential for corrosion related failure via the removal of dissolved oxygen. Carbonylhydrazide does not interact with any existing corrosion control mechanism or material of construction. The possibility of introducing a new failure mechanism or of extending existing failures beyond analyzed limits will not be created by introducing carbonylhydrazide as an oxygen scavenger. Chemical releases are anticipated and approved via the NPDES permit. Environmental review has determined that carbonylhydrazide is acceptable under that permit. No alternate environmental "accident" is possible. The introduction of carbonylhydrazide does not create the possibility of an accident different than those previously evaluated in the FSAR.

- 6) May the proposed activity create the possibility of a different type of malfunction of equipment important to safety than any previously evaluated in the SAR?

NO: The only potential interaction created by the addition of carbonylhydrazide is a direct impact on pressure boundary integrity. This chemical is only present during cold shutdown/wet layup and will degrade into other existing products prior to any system operation. Carbonylhydrazide will not interact adversely with any existing corrosion control mechanism or material of

construction. No potential for a new type of malfunction of equipment important to safety is created by the addition of carbonylhydrazide.

- 7) Does the proposed activity reduce the margin of safety as defined in the basis for any Technical Specification?

NO: The Technical Specifications do not address secondary system chemistry control with the exception of isotopic activity and programmatic controls. Secondary chemistry is only indirectly addressed via requirements for integrity of the steam generator tubes. Integrity is verified via minimum testing requirements and acceptance criteria, which are not altered by this assessment. Procedural changes necessary to implement the use of carbonylhydrazide conform to the program requirements outlined as part of the TS Administrative Controls. No change to the Technical Specifications is required to address the application of carbonylhydrazide included within this evaluation. The margin of safety for existing Technical Specifications is not reduced by the enhanced corrosion control provided by carbonylhydrazide.

### Conclusion

Based on this evaluation, the use of carbonylhydrazide to control dissolved oxygen levels during wet layup conditions does not constitute a nuclear safety concern. Modification of the requirements of the Nuclear Chemistry Parameters Manual to address the application of carbonylhydrazide is acceptable from a nuclear safety perspective. The presence of high dissolved oxygen levels does represent a potential economic risk. Dissolved oxygen has the potential to eventually adversely impact integrity of the steam generator tubes. On that basis, actions have been specified to approve the use of carbonylhydrazide to control dissolved oxygen in the steam generators through the use of the SG wet layup system. The use of carbonylhydrazide does not impact safe operation of the plant, constitute an unreviewed safety question or require a change to the Turkey Point Technical Specifications. Therefore, this activity does not require prior NRC approval.

### Action Items

The following items shall be tracked and completed via PMAI:

- (1) Revise procedures 3/4-OP-079 to:

- Incorporate an alternative in step 4.3 to use carbonylhydrazide for removal of dissolved oxygen in lieu of meeting the 100 ppb dissolved oxygen limit specified in steps 4.3.1, 7.1.1, 7.2.1, 7.4.1 and 7.5.1.
- Incorporate a Precaution in section 4 and sections 5.1.2 and 7.5.2 requiring that all chemical addition activities add only one chemical at a time. Chemicals may not be mixed within the chemical addition tank under any circumstances.

- Incorporate a similar CAUTION addressing chemical addition in section 5.1.

This action to be completed by Operations by September, 25, 2000, for Unit 4 and April, 2001, for Unit 3.

- (2) Verify that hydrazine analytical techniques remain valid and accurate in the presence of carbohydrazide. This action to be completed by Chemistry by October 1, 2000.
- (3) Identify and procure carbohydrazide for treatment of the steam generator secondary side. Procurement must reflect the contaminant limits discussed in action item #4 below and include chemical certification equivalent to other secondary side water treatment chemicals. Manufacturer recommendations for dosage, etc., shall be obtained from the selected supplier. This action to be completed by Chemistry, Procurement Engineering and Nuclear Materials Management by September 25, 2000.
- (4) Revise the Nuclear Chemistry Parameters Manual as follows:
  - Incorporate carbohydrazide normal and action values in the chemistry parameters for Steam Generators (Cold Shutdown/Wet Layup); values to reflect manufacturer recommendations for initial application
  - Incorporate a Note (or equivalent) in both Feedwater and Steam Generators (Heatup, Hot Shutdown, Hot Standby and Startup) addressing the hydrazine contribution from thermal decomposition of carbohydrazide; approximate contribution ratio is 2:3 for hydrazine:carbohydrazide on thermal decomposition
  - Incorporate a discussion or Note within Steam Generators (Heatup...Startup) addressing the potential temporary impact of carbohydrazide thermal decomposition on cation conductivity due to the formation of carbonic acid
  - Incorporate a Bulk Chemical specification for carbohydrazide solution including limits of 3 ppm each for Chlorides and Fluorides, 5 ppm for Sodium and 10 ppm for heavy metals; manufacturer specific requirements (including minimum concentration, etc.) may also be required based on PE review of procurement requirements

This action to be completed by Chemistry by September, 2000.

- (5) Develop an analytical method for carbohydrazide in the steam generators during ambient wet layup conditions. This method shall be issued as an NCAP procedure. This action to be completed by Chemistry by September, 2000.
- (6) Revise Chemistry procedure O-NCSP-200 to include applicable testing and verification of carbohydrazide solution. This action to be completed by Chemistry by September, 2000.

- (7) Revise Chemistry procedure O-NCSP-003, Attachment 3, to include carbonylhydrazide. This action to be completed by Chemistry by September, 2000.
- (8) Revise Chemistry procedure O-NCSP-004, Attachment 3, to include carbonylhydrazide testing for the steam generators. This action to be completed by Chemistry by September, 2000.
- (9) Revise the NPDES permit to include carbonylhydrazide. This activity is not required prior to implementation. Protection Services shall complete this activity by February, 2001.

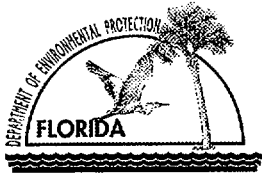
### References

- 1) Updated Final Safety Analysis Report, Revision 16, dated October, 1999
- 2) Turkey Point Technical Specifications, Amendment 207/201, dated 7/20/00
- 3) Turkey Point Units 3 & 4, Nuclear Chemistry Parameters Manual dated 2/10/00
- 4) EPRI *PWR Secondary Water Chemistry Guidelines* – Revision 5, March, 2000
- 5) EPRI *PWR Secondary Water Chemistry Guidelines* – Revision 4, November, 1996
- 6) Engineering Evaluation PTN-ENG-SEMS-00-001, Revision 0, "Use of Alternate Amines"
- 7) Procedure 3/4-OP-079, *Steam Generator Wet Lay Up System*
- 8) Procedure O-NCSP-003, *Secondary Chemistry Documentation*
- 9) Procedure O-NCSP-004, *Schedule for Periodic Tests*
- 10) Procedure O-NCSP-200, *Bulk Chemical Testing and Verification*
- 11) Nalco MSDS for Eliminox Oxygen Scavenger, dated 9/28/95
- 12) BetzDearborn MSDS for Control OS5613, dated 11/01/99



**Attachment 4 to PTN-LIC-01-005**

**Application for a Minor Revision  
to a Wastewater Facility or Activity Permit**



# APPLICATION FOR A MINOR REVISION TO A WASTEWATER FACILITY OR ACTIVITY PERMIT

## 1. Instructions

- In accordance with Rule 62-620.325, F.A.C., this form must be submitted to the appropriate Department district office or approved local program when requests for minor revisions to a permit or minor modifications to a facility are made by a permittee, except for transfer of a permit to a new permittee and addition of a major user of reclaimed water to a Part III reuse system. Application for transfer of a permit to a new permittee shall be made on DEP Form 62-620.910(11). Application for addition of a major user of reclaimed water shall be made on DEP Form 62-610.300(4)(a)1.
- Each applicable item must be completed in full in order to avoid delay in processing of this form. Where attached sheets or other technical documentation are provided, indicate appropriate cross-references.
- Three (3) copies of this application with supporting documentation shall be submitted with this form.
- All information is to be typed or printed in ink. Dates are to be entered in MM/DD/YR format.
- This application and attachments shall be signed in accordance with Rule 62-620.305, F.A.C. Also, as applicable, this application and all attachments shall be signed and sealed by a professional engineer registered in Florida in accordance with Rule 62-620.310, F.A.C.

## 2. Facility Information

- |                           |  |                                    |                     |
|---------------------------|--|------------------------------------|---------------------|
| a. Permit Number:         | <u>FL 0001562</u>  | b. Facility Identification Number: | <u>FLD000733683</u> |
| c. Project/Facility Name: | <u>Use of Carbohydrazide/ FPL Co. Turkey Point Plant</u> |                                    |                     |
| d. Contact Name:          | <u>Mr. William J. Burrows</u>                            |                                    |                     |
| Number and Street:        | <u>9760 S W 344th Street</u>                             |                                    |                     |
| City/State/Zip Code:      | <u>Florida City, Florida 33034</u>                       |                                    |                     |
| Telephone:                | <u>305-246-6215</u>                                      |                                    |                     |

## 3. Type of Revision

- Correct Typographical Errors<sup>1</sup>** - Submit one copy of each page of the permit showing revisions being requested.
- Change Improvement Schedule<sup>1</sup>** - Provide a description of the improvement, a list of the dates to be revised, and a reason for the proposed change in each date.
- Change Expiration Date of Permit<sup>1</sup>** - Provide the current and proposed expiration dates for the permit and the reasons for the proposed change.
- Change Staffing Requirements<sup>2</sup>** - Describe the proposed change and submit justification for the change in accordance with Chapter 62-699, F.A.C.

<sup>1</sup>A processing fee is not required.

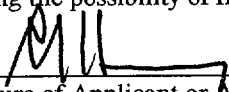
<sup>2</sup>A processing fee is required with the application in accordance with Rule 62-4.050, F.A.C.

- Change Monitoring and Reporting Requirements<sup>2</sup>** - Describe the proposed change and submit justification for the change in accordance with Chapter 62-601, F.A.C.
- Modify Approved Pretreatment Program<sup>1</sup>** - Describe the proposed modification and provide the information required by Rule 62-625.540, F.A.C.
- Delete Point Source Outfall<sup>1</sup>** - Identify the outfall and explain why the outfall is being eliminated.
- Modify or Expand Approved Residuals Land Application Sites<sup>2</sup>** - Attach a new or updated Agricultural Use or Dedicated Site Plan as required by Chapter 62-640, F.A.C.
- Minor Modification to the Facility<sup>2</sup>** - Provide a description of the proposed modification. If applicable, attach any reports, plans, and specifications which have been developed to implement this modification.
- Other<sup>2</sup>** - Provide appropriate documentation. Describe.

**4. Certifications**

a. Applicant or Authorized Representative

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.



3/21/01  
 \_\_\_\_\_  
 (Signature of Applicant or Authorized Representative<sup>3</sup>) (Date)

Name (please type) R. J. Hovey Company Name Florida Power and Light Co.  
 Title Site Vice President Company Address: 9760 S W 344th Street  
 Phone: (305) 246-1300 City/State/Zip Code: Florida City, Florida 33034

b. Professional Engineer Registered in Florida

I certify that the engineering features of this project have been (designed) (examined) by me and found to conform to engineering principles applicable to such projects. In my professional judgement, this facility, when properly constructed, operated, and maintained, will comply with all applicable statutes of the State of Florida and rules of the Department.

Name (please type): Sergio P. Chaviano  
 Florida Registration Number: 41855  
 Company Name: Florida Power and Light Co.  
 Company Address: 9760 S W 344th Street  
 City/State/Zip Code: Florida City, Florida 33034  
 Phone Number: (305) 246-6927

  
 \_\_\_\_\_  
 (Seal, Signature, Date, and Registration Number)

<sup>3</sup>If signed by the authorized representative, attach a letter of authorization in accordance Rule 62-620.305, F.A.C.

**Attachment 5 to PTN-LIC-01-005**



WARNING: Original document has a reflective watermark on reverse side. Hold at an angle to view.  
For Inquiries call (305)485-6700

64-1278  
611

SAP Disbursement Account  
Bank of America  
Atlanta, Dekalb County, Georgia

Check Date: 03/16/2001

Check No. 0124721

TWO HUNDRED FIFTY DOLLARS

\$250.00

PAY TO THE ORDER OF STATE OF FLORIDA  
DEPT OF ENVIRONMENTAL PROTECTION  
2600 BLAIR STONE ROAD  
TALLAHASSEE FL 32399

FLORIDA POWER & LIGHT CO.

⑈0124721⑈ ⑆061112788⑆ 3299977761⑈

Florida Power & Light Co.  
Vendor Name: STATE OF FLORIDA

Check Date : 03/16/2001  
Check Number: 0124721

| Invoice Number | Invoice Date | Document Number<br>Text                    | Gross Amount | Discount | Net Amount       |
|----------------|--------------|--|--------------|----------|------------------|
| NPDES PERMIT   | 03/15/2001   | 1900032471<br>FL0001562 PTN COOLING CANALS | 250.00       | 0.00     | 250.00           |
|                |              | <b>Check Total.....</b>                    |              |          | <b>\$ 250.00</b> |